

Simulating Next-Generation User Interfaces for Law Enforcement Traffic Stops

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Motivation

The need to integrate new technologies into the routine of traffic stops is an evident concern among law enforcement agents. The successful adoption of novel user interfaces relies on:

- A clear understanding of first responders' requirements and contexts of use.
- The ability to simulate future technology while the technology is still under development and not ready for the consumer market.
- Participatory design with first responders with multiple iterations taking expert feedback into account.

Interface Features

Goal

To simulate a next-generation user interface that has the potential to increase safety and agility to police officers during traffic stops.

Contributions

- A user interface design informed by the needs and culture of law enforcement.
- A traffic stop VR scenario where common procedures are enhanced with simulated augmented reality.
- A virtual on-demand arm-mounted display that shows information fed by a simulated image recognition system.
- A situational awareness interface with levels of intensity based on the information gathered.

Real-time data gathering



The interface automatically identifies the vehicle's plate and searches for its information. Color code represents the status of the search.

On-demand information display



Once the information is fetched, the interface sends an alert. The officer can see the information in the arm-mounted display.

Situation awareness



Haptic and visual alerts convey situational awareness clues that represent the status of the findings. Higher risk, higher alert intensity.

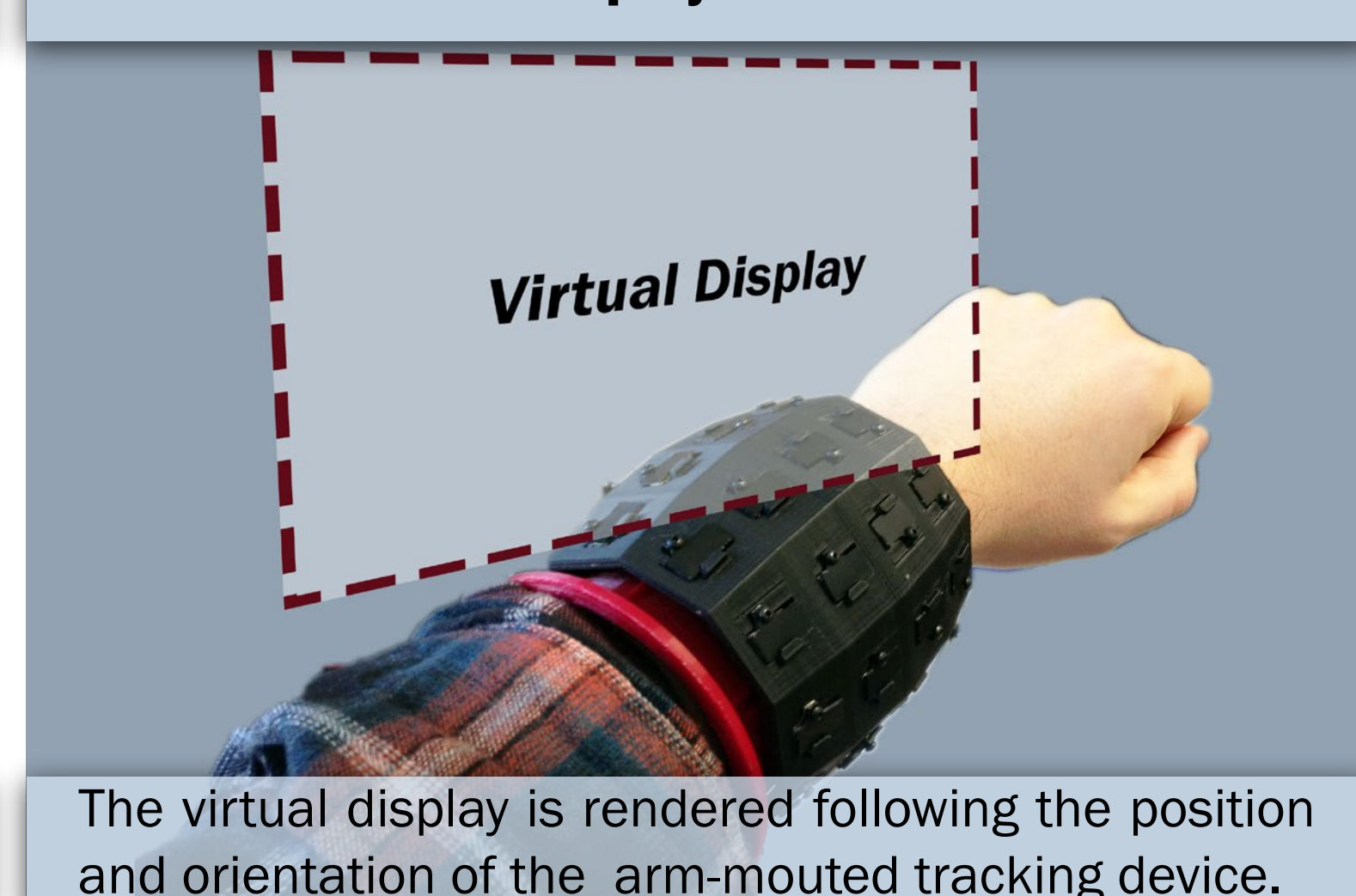
Arm-mounted tracking device

3D printed shell with tracking hardware



The tracking device attaches to the arm and provide 6 DOFs.

Virtual display attachment



The virtual display is rendered following the position and orientation of the arm-mounted tracking device.

Discussion

The proposed interface is designed to supplement the existing in-car computer system. Quickly and easily accessible information with the arm-mounted display, along with situational awareness notifications, aim to increase safety to the responding officer. Low risk tasks remain in the traditional interface.

Next Steps

Assess, through user studies:

- Situational awareness performance of different alert modalities (visual, haptic, audible);
- Levels of interaction fidelity, from natural interaction to indirect metaphors;
- The situational awareness interface with levels of intensity based on the information gathered.

We intend to perform the evaluations with a group of law enforcement collaborators.

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